

# **A METHOD, APPARATUS AND SYSTEM FOR MULTIPLE SIGNAL TRANSMISSION, RECEPTION, AND RESTORATION**

## **ABSTRACT**

5       Techniques for increasing the capacity of a radio link, using radio signal  
superimposing in space and frequency and subsequent signal restoration, are  
described. Each of the transmitting and receiving systems are connected to a  
plurality of collocated antennas. The signals that are superimposed are recovered  
by one or a plurality of restorers. The disclosed method of signal processing  
10       involves appropriate filtering of signals, then summing them in order to restore  
the original individual signals and to cancel out all undesired signals received as a  
result of superimposing. Preferably, the spacing between antennas is optimized  
so that while the undesired signals are minimized or canceled out, the restored  
signals are maximized. In simple situations, signal filtering may be reduced to  
15       phase adjustment of the signals and the restoration may be done at RF, IF or  
baseband. In more complex situations, general adaptive filters implemented in  
baseband may be preferred. Various embodiments of the restorer are presented.